

CLAIMS

- 1 1. A method for managing a time-limited long-running process carried out upon an
2 array of disks comprising the steps of:
3 establishing a registry of entry with respect to each of a plurality of groups of
4 disks of the array of disks having a value indicative of a respective time at which each of
5 the group was last acted-upon by the long-running process; and
6 performing the long-running process on each of the groups based upon an order in
7 which the groups having an oldest last acted-upon time are processed first and the groups
8 having the newest last acted-upon time are processed last.
- 1 2. The method as set forth in claim 1 further comprising updating a value of the last
2 acted-upon time for each of the groups as each of the groups is respectively completely
3 processed by the long running process.
- 1 3. The method as set forth in claim 2 further comprising ceasing the long-running
2 process based upon a time limit from an initiation time of the long-running process.
- 1 4. The method as set forth in claim 3 wherein the step of ceasing the long-running
2 process includes ceasing the step of updating so that the groups not completely processed
3 by the long-running process retain a previous value for their respective last acted-upon
4 time.
- 1 5. The method as set forth in claim 4 wherein the step of establishing the registry
2 entry includes providing a value for a last position in each of the groups at which the
3 long-running process was performed and wherein the step of ceasing the long-running
4 process includes providing, in each of the groups for which the long-running process was
5 not completed, the respective last position value.
- 1 6. The method as set forth in claim 5 wherein the groups each comprise groups of
2 disks based upon a redundant array of independent disk (RAID) organization and the last

3 position value is based upon a predetermined data stripe within each of the respective
4 groups of RAID-organized disks.

1 7. The method as set forth in claim 6 wherein the long-running process comprises a
2 RAID scrubbing process.

1 8. The method as set forth in claim 6 wherein the registry comprises a set of key
2 values including a volume-related file system identifier and a RAID group identifier with
3 respect to RAID groups within the volume.

1 9. The method as set forth in claim 8 wherein the registry is located in a file that is
2 read from at least one storage location on the array of disks.

1 10. The method as set forth in claim 6 further comprising sorting each entry in the
2 registry based upon the last acted-upon time value and establishing a process queue, the
3 order of which is the order in which the long-running process is performed on respective
4 of the groups.

1 11. The method as set forth in claim 5 further comprising setting a value of the last
2 acted-upon time for each of the groups that is newly added to the registry to the oldest
3 last acted-upon time.

1 12. The method as set forth in claim 11 wherein the last position value for each of the
2 newly added groups and the last position value for each of the groups completely proc-
3 essed is a beginning group data location value.

1 13. The method as set forth in claim 10 further comprising defining a plurality of
2 working threads, each performing the long-running process, each of the threads per-
3 forming the process to a top entry in the process queue as each thread is ready to take on
4 one of the groups for processing thereon.

1 14. A system for managing a time-limited long-running process carried out upon an
2 array of disks comprising:

3 a registry that stores an entry with respect to each of a plurality of groups of disks
4 of the array of disks having a value indicative of a respective time at which each of the
5 group was last acted-upon by the long-running process; and

6 a sorting long-running process on each of the groups based upon an order in
7 which the groups having an oldest last acted-upon time are processed first and the groups
8 having the newest last acted-upon time are processed last.

1 15. The system as set forth in claim 14 further comprising means for updating a value
2 of the last acted-upon time for each of the groups as each of the groups is respectively
3 completely processed by the long running process.

1 16. The system as set forth in claim 15 further comprising a timer that ceases the
2 long-running process based upon a time limit from an initiation time of the long-running
3 process.

1 17. The system as set forth in claim 16 wherein the timer is adapted to cease the
2 means for updating so that the groups not completely processed by the long-running pro-
3 cess retain a previous value for their respective last acted-upon time.

1 18. The system as set forth in claim 17 wherein each registry entry includes a value
2 for a last position in each of the groups at which the long-running process was performed
3 and wherein each entry further includes a last position value for each of the groups for
4 which the long-running process was not completed.

1 19. The system as set forth in claim 18 wherein the groups each comprise groups of
2 disks based upon a redundant array of independent disk (RAID) organization and the last
3 position value is based upon a predetermined data stripe within each of the respective
4 groups of RAID-organized disks.

1 20. The system as set forth in claim 19 wherein the long-running process comprises a
2 RAID scrubbing process.

1 21. The system as set forth in claim 19 wherein the registry comprises a file including
2 a set of key values including a volume-related file system identifier and a RAID group
3 identifier with respect to RAID groups within the volume.

1 22. The system as set forth in claim 21 wherein the file system identifier and the
2 RAID group identifier correspond with a disk label file system identifier and a disk label
3 RAID group identifier located in a predetermined storage location on one or more of the
4 disks in the array of disks.

1 23. The system as set forth in claim 22 wherein a value of the last acted-upon time for
2 each of the groups that is newly added to the registry is set to the oldest last acted-upon
3 time.

1 24. The system as set forth in claim 23 wherein the last position value for each of the
2 newly added groups and the last position value for each of the groups completely proc-
3 essed is a beginning group data location value.

1 25. The system as set forth in claim 24 further comprising a plurality of working
2 threads, each performing the long-running process, each of the threads performing the
3 process to a top entry in the process queue as each thread is ready to take on one of the
4 groups for processing thereon.

1 26. A computer-readable medium including program instructions executing on a
2 computer for managing a time-limited long-running process carried out upon an array of
3 disks, the program instructions performing the steps of:
4 establishing a registry of entry with respect to each of a plurality of groups of
5 disks of the array of disks having a value indicative of a respective time at which each of
6 the group was last acted-upon by the long-running process; and

3 a file system identifier indicating a volume of the disk array and a group identifier
4 indicating a discrete storage organizational group of the volume, each of the file system
5 identifier and the group identifier corresponding with identifiers stored within one or
6 more disks of the array of disks; and

7 a last acted-upon time value representative of a time at which the long running
8 process was last performed on the group, the last acted-upon time adapted to be updated
9 to a current timestamp when the long-running process is completed on the group and to
10 be read so as to form a queue by which each group is processed by the long-running pro-
11 cess, with an oldest last acted-upon time value being processed first and a newest being
12 processed last.

1 33. The data structure as set forth in claim 32 further comprising a last data position
2 value that indicates a last data position within a group that has been processed by the
3 long-running process adapted so that the long-running process begins processing at the
4 last data position in the group.

1 34. The data structure as set forth in claim 33 wherein the last data position is set to a
2 beginning data position if the group is newly added or completely processed in a previous
3 run of the long-running process.

1 35. The data structure as set forth in claim 32 wherein each group comprises a group
2 organized as a redundant array of independent disks (RAID) the group identifier com-
3 prises a RAID group identifier.